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Drivers of home garden growth beyond food security and income: lessons from South Africa

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Abstract

While research on home gardens is not new, its significance has been chiefly narrowed down to food security and income. More so, there is still lack of information on the subject, including factors that better influence home garden participation decision between emotional/psychological perceptions and socioeconomic characteristics remain unknown. This paper determines if the socioeconomic characteristics of the household head better influences home garden participation decisions than emotional and psychological perception. It investigates the scale of preference behind households' involvement in the home garden. The study area is Eastern Cape Province, South Africa. A multistage sampling procedure of two stages that incorporated an in-person interview approach was employed to collect data from 360 respondents. Analytical tools used include weighted score, descriptive and inferential logistic regression model. Home garden plays a crucial role in general household heads' well-being, including emotional and psychological perception, income, food security, and food diversity, while improving the household heads' relationship with neighbours. Ironically, most households (71 percent) still lag in the adoption of home gardens. The Household heads' age, marital status, educational type, size of household, anticipated pleasure to be derived for involving in home gardens, expectation of inputs to be provided by the government, and home gardens awareness campaign influenced home garden participation decision. Socioeconomic characteristics influenced households' home garden participation decisions than emotional feelings and perception. The top drivers of the household head's involvement in home gardening are fresh, healthy food and pleasure and not food security and income. Home gardeners' awareness campaign is limited. Either agricultural policy in South Africa failed to capture and drive the benefit of the home garden, or not effective enough to bring home garden beneficiary awareness to the majority of households for broader participation.

Keywords: Decision; Household; Participation; Motive; Pleasure; Psychological.

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1. Introduction

Although, South Africa is food secured at the national level, the same cannot be said of household level (Hendriks, 2014). Efforts are being made to ensure that many homes are food secured at household level, and home gardening is a strategy to promoting food security (Cabalda et al., 2011; Galhena et al., 2013). Home gardening creates avenue to cultivate various ranges of crops. Hence, home gardening entails the cultivation of herbs, vegetables, fruits, and shrubs mainly for personal consumption at home (Algert et al., 2016; Galhena et al., 2013; Talukder et al., 2010). Some home gardeners go as far as rearing animals on a portion of their garden (Raymond et al., 2019).

Home gardening plays a vital role in some individuals' daily live by aptly providing extra-curricular activities (Al-Mayahi et al., 2019). It offers the opportunity to turn an outside space into a productive and functional area that is beneficial to the family. In some cases, it acts as a home for animals and plants that have otherwise lost their habitats to urbanization (Cabalda et al., 2011). It creates aesthetics and diversity for insects and birds, accompanied by appealing flower beds (Raymond et al., 2019). Findings by Lal (2020) stated that home gardening ensures food security for urban households during period of crisis but this huge benefit is yet to be harnessed by most households. This is as poverty and food insecurity are mainly pervasive in most rural and some urban developing countries, where most households in these areas are expected to participate in home gardening. However, this is not the case (Zimpita et al., 2015). No doubt that some households in some areas have adopted home garden practices as a lifestyle, but a larger number of households are still lagging and struggling with adoption and home garden practices due to their poor awareness of its inferences (Algert et al., 2016).

Poor home garden adoption and participation are more prevalent in developing nations, with only 35 percent of the households owning a home garden in some cases (Akerele et al., 2017). Despite increasing home garden knowledge in promoting food security in South Africa, many households are yet to fully participate in home gardens (Sinesipho, 2020). However, the proportion of households who participate and benefit from home gardens vary from place to place, and the variation could be between urban and rural households. For example, while the proportion of households who owned and benefited from home gardens could be up to 70 percent in some urban communities of Mexico, it was less than 30 percent in some other urban communities of Mexico (Castañeda-Navarrete, 2021). The challenge of most households not participating in home gardens is not peculiar to developing countries alone, but also found to be a major problem in a developed country such as the United Kingdom, which recently reported that a large proportion of the households do not participate in home garden (Office for National Statistics, 2021).

One wonders why most households, including those in rural areas do not participate in home gardens, and yet research has long ignored the holistic households' home garden participation decision-making (Mitchell and Hanstad, 2004; Yanga and Taruvinga, 2021). Ironically, past research on home gardening (Cabalda et al., 2011; Galhena et al., 2013; Gerny et al., 2021; Lal, 2020; Raymond et al., 2019) focused is on challenges, its contribution to food security, and income benefit, factor precluding households' home garden involvement decision has been systematically and significantly neglected. Peradventure, households' home garden involvement decision which research has failed to investigate could amidst other things stem from socioeconomic characteristics (Yanga and Taruvinga, 2021).

In another development, there is a lack of policy targeting the improvement of home gardening involvement despite the research unveiling its significance (Mitchell and Hanstad, 2004). Most agricultural policies do not only omit home garden, the few that recognised home garden challenges are poorly implemented (Mattsson et al., 2013). The lack effective policy framework and implementation targeting home garden in many countries could be a strong rational most household are not involving in home garden (Galhena et al., 2013). Ironically, research largely seems not to address the household heads' perception, reactions, and the effectiveness of policies and programmes targeting home gardens (Mckay, 2011). This is when a better approach and policy, together with a good understanding of home gardens evolution, are needed in the light of increasing population pressure, urbanization changes, and benefits that go with home garden changes in some parts of the world (Hoogerbrugge and Fresco, 1993). On the other hand, the lack of research explaining households' reactions in terms of perception and benefit of governments' home garden policy and programme could be why there is a poor government disposition on holistic, consistent, and effective home garden policy in many countries.

Therefore, it is necessary to investigate the household's perception of government home gardens policy and programme and every in-tween in South Africa. Most importantly, it is essential to investigate the various factors of households' home garden participation decisions since there is a lack of investigation in a global sphere into the role of emotional feeling and psychological perception on household decisions to participate in the home garden. Therefore, inherent household characteristics beyond socioeconomic characteristics could prevent/stimulate involvement in the home garden decision. This is more important because the holistic knowledge of the home garden will stimulate the participation of a large number of households in the home garden (Shisanya and Hendriks, 2011). An individual's socioeconomic, emotional, and psychological characteristics have been reported to play a crucial role in individual action and inaction (Kariman et al., 2014; Martikainen et al., 1999). These form the core reason the socioeconomic and emotional variables were suggested for the analysis. More so, research has revealed that income and food security are reasons home gardeners participate in home gardening (Cabalda et al., 2011; Galhena et al., 2013; Gerny et al., 2021; Lal, 2020). However, research has failed to determine the scale of preference and the top motive of home garden participation.

This paper aims to contribute to the literature that could promote adoption of the home garden by most households as part of a survival strategy in mitigating food insecurity. But again, and most importantly, the research outcome also seeks to fill the gap in the literature that had failed to address the scale of preference in which some households participate in the home garden and unveil if there are salient benefits of home gardening beyond beauty, food security, and income. The research aims to examine if it is necessary for all stakeholders, including government, NGOs, researchers, and households alike, to intensify efforts toward the revamp of home gardening. More specifically, the objectives of this research include the following:

- To investigates the decision and factors, such as socioeconomic characteristics, emotional feelings, and psychological perception of the household head that influence home garden participation decisions.
- To determine if the socioeconomic characteristics of the household head better influences home garden participation decisions than emotional and psychological perception.
- To analyze and compare the characteristics of home garden participants and non-participants in the study area.

- To identify and determine the scale of preference of the fundamental reason behind households' involvement in the home garden.
- To investigate the households' opinions on home garden policy.

2. Literature review

Food security is unrestricted access by individuals or households to sufficient, safe and nutritious food (Faber et al., 2011). Although, South Africa is food secured at the national level, that is, it produces most of the required food to feed its average population; the same cannot be said at the household level (De Cock et al., 2013). For example, Statistics South Africa (Stats SA) stated that while the number of households with food security challenges in South Africa dropped from 13.5 million in 2002, food insecurity still affects 1.7 million households (Stats SA, 2017). Like poverty, food insecurity mainly affects Black Africans in South Africa, especially large households in the poorest province such as the Eastern Cape (Stats SA, 2017). The main drivers of food insecurity is lack of income to purchase food and little production of own food. De Cock et al. (2013); Maziya et al. (2017) found the several determinants of household food security among farming rural households in Limpopo and KwaZulu Natal. The positive and statistically significant determining factors of household food security are, smaller household size, more educated household head, higher household income, married household head, and farming experience. Agricultural land availability is also key determinant of food security, especially among urban dwellers (Odudu and Omirin, 2012). These determinants are similar to those estimated by Afulani et al. (2015) for poverty, which confirms the relationship between poverty and food security.

Among the many initiatives for addressing food insecurity, gardens have been identified as one effective tool. While home gardens could not entirely address food insecurity on their own, their contribution is significant (Shisanya and Hendriks, 2011). There are huge potentials in home gardens if pragmatic approaches built from local activities are implemented (Kirsten, 2020). What seems to be limiting the contribution of home garden to food security is production difficulties related to access to water and lack of inputs (Syme et al., 2004). These factors together with socio economic characteristics and production methods make the contribution of home gardens relatively minimal (Gbedomon et al., 2015). Despite the challenges associated with the community or home garden, globally, community food gardens are considered as valuable means of addressing food security and empowering communities (Shisanya and Hendriks, 2011).

3. Methodology

The study was carried out in the Raymond Mhlaba Municipality of the Eastern Cape Province, South Africa. Raymond Mhlaba Municipality was established in 2016 through the amalgamation of Nkonkobe and Nxuba Municipalities under the jurisdiction of the Amathole District. The major towns in Raymond Mhlaba Local Municipality include Adelaide, Alice, Middledrift, Fort Beaufort, Bedford, Seymour, and Hogsback (Stats SA, 2016). The municipality is home to diverse household heads of white, coloured, black South Africans and foreign immigrants who are involved in several economic activities, including lecturing, government staff, farmers, artisans, and traders, with an average household of 41, 022 (Waimap, 2016).

3.1. Sampling procedure, sample size and analytical techniques used

A multistage sampling procedure of two stages was employed for the data collection. The first stage involved a random sampling of six towns out of the seven major towns in Raymond Mhlaba Municipality. The six towns that were randomly sampled include; Adelaide, Alice, Middledrift, Fort Beaufort, Bedford and Hogsback. The second stage involved random sampling of 60 households from each of the six major towns. It should be noted that in-person interview approach was incorporated into the second stage of the multistage sampling procedure. Hence, data was collected from 360 household heads using the open and close-ended questionnaire. The application of a multistage sampling procedure that involved the use of simple random probability sampling ensured that all households were given equal opportunity to participate in the research, irrespective of economic activity and whether the household was involved in a home garden or not (Dan-Abia et al., 2019).

The analytical techniques used were descriptive and inferential statistics such as frequency, percentage, mean, weighted score, and logistic regression model. Qualitative research design involving non-numerical data of the open aspect of the questionnaire was used to understand concepts, opinions, or experiences of households on the government home garden policy.

3.2. Theoretical framework for the use of the logistic regression model

The application of the logistic regression model for this analysis is based on the fact that the household's decision is a binary/dichotomy choice that relates to probability function (Hilbe, 2009). That is, the household head could decide to participate in the home garden or not. As a probability function, the household head's decision follows a Bernoulli distribution that could take the value of 1 if the household head decides to participate in the home garden and 0 if otherwise. Therefore, the probability that a household head participates in a home garden is P, and that another household did not participate in the home garden is Q, which is equal to 1-P (Walsh, 1987).

$$1\text{-}P \qquad (1)$$

In the process of Binoullli distribution, the odds of household head's decision to participate in home garden becomes probability P or not to participate which is Q. Hence, the odds of the household decision to participate in home garden "P" are divided by the probability not to participate Q. Therefore, the odds of the household head home garden participation decision (Hd) is expressed as shown in Equation 2 (Allison, 2012):

$$Hd\,\frac{P}{1-p} \qquad (2)$$

where, Hd is the unknown probability of the household head's decision to participate or not to participate in the home garden. Taking the natural logarithm (In) of Equation 2 above into consideration, the household head's home garden decision is expressed as shown in Equation 3.

$$In\frac{P}{1-p} \qquad (3)$$

where, In is the natural log of the household head's home garden participation decision, but recall that the natural log is the logarithm to the constant e, and e is a mathematical constant of natural exponent with a value of 2.7 (Dunham, 2022). However, since the household probability decision is unknown, it follows the logistic regression. But the goal of the logistic is to predict the probability of a linear combination of the factors (independent variables) affecting the decision (Allison, 2012).

The probability estimation is called p-hat *P*; however, the challenge is how to tie the linear combination of the independent variables that could predict the probability value that ranges between zero and one with the function that links the natural log, referred to as the logit (Stoltzfus, 2021). The linking involved equating the logit of the household probability to the natural logarithm of the probability to essentially the linear combination of the dependent variables, which is expressed in Equation 4 (Stoltzfus, 2021).

$$Logit\ (p)\ =\ In\frac{P}{1-p} = \beta_0 + \mathrm{B}_1\chi_1 \qquad (4)$$

Hence, we are going to estimate the actual probability *P* of the household decision by taking the antilog of all sides. Remember, the goal here is to isolate the probability *P*, because in the end, the aim is to estimate the probability *P*. To achieve that, we have to find the value of *P*, and this can be done using simple algebra and logarithm rules. Hence, the first step is to take the antilog of everything in Equation 4 to arrive at Equation 5.

$$\frac{P}{1-p} = e^{\beta_0+\beta_1\chi_1} \qquad (5)$$

By taking the antilog, the outcome is *p* divided by one minus *p* shown on the left side of Equation 5, with the Euler constant *e* raised to the linear combination of the independent variables of beta zero plus beta one-x one on the right side. Using algebraic distribution to ensure P isolation in Equation 5, we got Equation 6.

$$\text{So, } p = e^{\beta_0+\beta_1\chi_1}\ (1\text{-}p) \qquad (6)$$

Further expansion of Equation 6 implies getting Equation 7.

$$p + e^{\beta_0+\beta_1\chi_1} * p == e^{\beta_0+\beta_1\chi_1} \qquad (7)$$

If *p* is factored out by swinging everything in the parentheses in Equation 7, we will arrive at Equation 8.

$$p(1+e^{\beta_0+\beta_1\chi_1}) = e^{\beta_0+\beta_1\chi_1} \qquad (8)$$

In continuing the algebraic estimation for *p-hat*, we arrive at the logistic regression as presented in Equation 9.

$$\hat{P} = \frac{e^{\beta_0+\beta_1\chi_1}}{1-e^{\beta_0+\beta_1\chi_1}} \qquad (9)$$

3.3. Variable measurement

The description of the logistic variables, unit of measurement and their expected outcome are presented in Table 1. The dependent variable being binary was measured as dummy that takes the value of 1 if the household head decides to participate in the home garden and 0 if otherwise.

Table 1. Description of logistic explanatory variables and expected outcome

Variables	Description	Unit of measurement	expected outcome
Gender	Gender of the household head	Dummy, Male = 1, otherwise = 0	+/-
Marital status	Currently married	Currently married = 1, otherwise = 0	+
Age	Number of years	Continuous	+/-
Education status	Years spent in school	Continuous	+
Household size	Number of household members	Continuous	+/-
Pleasure	Could pleasure be derived from home garden?	Dummy, yes = 1, otherwise = 0	+
Inputs provision	Are you expecting the government to provide inputs for home garden purposes?	Dummy, yes = 1, otherwise = 0	+
Agricultural knowledge	Do you believe home garden can provide you and your household the opportunity to learn about agriculture	Dummy, yes = 1, otherwise = 0	+
Home garden awareness	Have you received home garden awareness campaign	Dummy, yes = 1, otherwise = 0	+

Source: Authors

4. Result and discussion

4.1. Home gardener and non-home gardener households' socioeconomic characteristics

Several people live in the same location, but there might be inherent attributes that make them behave differently. This makes our research to firstly consider the distribution and socioeconomic pattern of the household heads involved and those not involved in the home garden. Female household heads dominate the study area. The dominance of the female household heads in the study areas is not in line with the household structure where the heads of most households are males (FAO, 2002; IFPRI, 2012). However, the result agrees with the 2011 Eastern Cape Province household profile and distribution released by Stats SA (2014).

A close look at the result in Table 2 shows that the majority of the household do not own home garden. Out of the 360 sampled respondents, only 104, which represent 29 percent of the respondents, participated in the home garden. Although, home garden is not a new phenomenon; its acceptance is very slow, with a handful of households currently having home gardens in the study area. Most household heads have never practiced home garden, or their involvement in home gardens is not consistent. This trend of most households not

involving in home garden is similar to the findings of Akerele et al. (2017); Yanga and Taruvinga (2021), who affirmed that limited households participate in home gardens.

Table 2. Summary statistics of frequency distribution

Variable	Household distribution		Do not have home garden		Have home garden	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Gender						
Female	200	56	148	74	52	26
Male	160	44	108	67	52	32
Marital status						
Married	272	76	182	67	90	33
Single	88	24	74	84	14	16

Source: Computed from field survey data, 2022

The proportion of home garden participants is higher among males. Ordinarily, more female households should own home gardens since they slightly dominate household heads in the area; and they should see the home garden as an accessible channel for getting food items quickly and easily to the kitchen. However, the reverse is the case. The result shows an equal number of home garden ownership across gender distribution; -but the percentage of male-headed household home garden participants is higher than their female counterparts in the study area. This result is contrary to the findings of Mcata, (2019), which stated that the proportion of female household heads involved in home gardens is higher than males.

The male household heads having a higher percentage of home gardeners could be attributed to several reasons. One of these reasons could be because men are determined to promote and ensure household food security through the home garden. Another reason more males are involved in home gardens could be because males are stronger and might take advantage of their strength to get involved in home gardens than their female counterparts because some home garden activities might be strenuous that many females cannot undertake.

There are more married household heads than single household heads among the sampled respondents, and more married household heads owned home gardens in the study area. This means that a married household is more interested in the home garden than the unmarried/single household. The outcome of the married distribution corroborates the findings of (Mdiya and Mdoda, 2021) which states that the fraction of married household is far higher than single household in the study area. The age distribution shows a good spread among the home gardeners. On average, the household heads in the study area are in their mid-fifties.

The educational level of household heads who participated in home garden is slightly higher than those who do not participate. This result is similar to that of Akerele et al. (2017), which stated that households with formal education participate in the home garden more than those with informal education. The educated household heads being enlightened might be interested in knowing the process, stages, and period it takes to cultivate some of the food crops consumed at home, and this could be easily achieved through home gardens. This means that household head with higher education might be more willing to participate in home garden compared to those with lower level of education. More so, while an increase in education could make

household heads understand the benefit and the need for the home garden, they can see it as a platform to acquire basic agricultural knowledge. The average household size of the respondents is 6 people. However, the household size of those not involving in home garden is larger than those involving in home garden.

Table 3. Summary statistics of mean distribution

Variable	Mean	Std. Dev.	Min	Max
Age				
Do not have home	54.91	8.98	30	74
Have home garden	55.13	8.76	39	72
All respondents	54.98	8.91	30	74
Education status				
Do not have home	6.29	4.46	0	14
Have home garden	8.89	4.89	0	20
All respondents	7.047	4.73	0	20
Household size				
Do not have home	5	2.34	1	15
Have home garden	3	2.29	0	12
All respondents	4	2.38	0	15

Source: Computed from field survey data, 2022

4.2. Socioeconomic characteristic that influences home garden participation decision

The household head might decide to own a home garden. However, the household head's decision is a binary one that is associated with socioeconomic characteristics. Binary logistic regression analysis is best explained using the coefficient of the logit result and the odds ratio output. The fact is, the odds ratio can only be performed with logit regression. Hence, both the outcome of the logit and odds ratio was used to interpret the relationship between households' garden decisions and the independent variables as the case may be.

Table 4. Socioeconomic characteristics that determined household head's home garden participation decision

Variable	Coeff	Std. Err	[95% Conf	Odds Ratio	Std. Err.	[95% Conf.	P>|z|
Gender	-.2761	.2553	-.7765	.7587	.1937	.4600	0.279
Age	.0310	.0154	.0007	1.0315	.0159	1.0007	0.045
Marital status	.9021	.3466	.2226	2.4648	.8545	1.2494	0.009
Educational type	.1301	.0293	.0727	1.1390	.0334	1.0754	0.000
Household size	-.2624	.0632	-.3865	.7692	.0487	.6795	0.000
Average Monthly income	2.61e-06	8.42e-06	-.00001	1.0000	8.42e-06	.9999	0.756
Cons	-3.1861	1.0322	-5.209385	.0413312	.0427	.005465	0.002

Source: Computed from field survey data, 2022

, **, and * indicate significance at 0.6, 0.05, and 0.001 percent probability level respectively.*

Number of obs = 360, LR chi2 (6) = 55.51, Prob> chi2 = 0.0000, Pseudo R2 = 0.1283

The age of the household head, marital status, educational status, and household size are the socioeconomic characteristics that influence the household head's decision to own a home garden. The age of the household head has a positive relationship with the odds of the probability of involving in home garden. Although, their report is not on the decision-making process, this result is similar to the study of Gbedomon et al. (2015), which observed that age affects home garden ownership. At a given age, the household head is 1.03 times more likely to have involved in home garden practice than those of lesser age group. In other words, one year increase in household head's age increases the odds of engaging in home garden by 3 percent. This result indicates that older household heads (older persons), irrespective of their gender and income, are more likely to embark on home gardening. This could be due to the fact that some older persons after retirement will want to be involved in activities around the home, and home garden could offer them the opportunity. Drawing from the outcome of the logistic age variable, older household head might find it more pleasurable involving in home garden.

Recall that marital status measurement is coded one if the household head is married and zero if otherwise. Since the coefficient of the marital status for the logistic result is positive, it means that the probability of participating in the home garden is higher among married-headed households than in their single-headed household counterparts. On the average, there is a 0.90 probability difference between married and single household heads' decisions to participate in home gardens. The married household head reported having a home garden participation score of 0.90 higher than a single household head. A married household head's odds of having a home garden are higher by a factor of 2.46 than a single household head's odds of participating in a home garden. The influence of the marital status on household decision to participate in the home gardens is similar to the report by Adeosun et al. (2020) on the role of marital status in overcoming the hurdle of home garden involvement. Unlike the single household, which might not spend much money on food items as their married counterpart, the influence of marriage on the household head's decision to venture into home garden participation could be evidenced by a married-headed household's need to reduce expenditure on food items. For example, money that would have been spent on food items gotten from home garden could be channeled to other uses, thereby, reducing the financial burden on the married household head.

The household head's education is positively related to the likelihood of having home garden. Basically, higher level of educational attainments will result in greater likelihood of household head getting involved in home garden. On the other hand, the lower the household's educational attainment level, the less the probability of having a home garden. This result corroborates the findings of Yanga and Taruvinga (2021), which states that household head's education.is essentially crucial to the home gardens optimization and involvement. The influence of education on the household head's decision to own a home garden could also be attributed to the knowledge of nutritional components associated with the freshness of food products most likely to be gotten from the home garden produce. This result could also be attributed to the knowledge of food choices that household heads could get from formal education and day-to-day occurrences of food choice preferences by educated people. A higher level of education could give the household head a holistic knowledge of the home garden, possibly driving the household head's involvement in the home garden.

Increasingly large household size negatively influences the household head's decision to participate in the home garden. The result shows that for every one person added to the household, the odds of the household head's decision to have a home garden decrease by 0.77. In other words, with an increment in household size by one person, the odds of household head participating in home garden decrease by 77 percent. The outcome of the household size results in this study disagrees with results from Cabalda et al. (2011) that there was no

significant difference in household size between households with and without gardens. It, however, agrees with Mcata (2019), which stated s that household size, especially household size headed by a female is significant for the home garden involvement. The result could be attributed to the fact that as the household size grows larger; the household head might feel that produce from the home garden might not substantially contribute to the household's food security, which might discourage the household head's decision to participate in the garden. In another development, a larger household member might increase interaction within the household members, which might decrease the household head's decision to interact with nature through home garden involvement.

4.3. The effect of emotional feeling and psychological perceptions on home garden participation decision

The logistic modeling of emotional feeling and psychological perception factors on home garden participation is presented in Table 5. The analysis outcome concerning the significant emotional feeling and psychological perceptions variable was interpreted using the coefficient of the logit outcome and that of the odds ratio. The intensification of the home garden awareness campaign, the anticipated provision of inputs to households by the government for home gardening, and the pleasure derived from getting involved in the home gardens are the psychological and emotional feelings that have a high probability of influencing home garden participation decision.

Table 5. Household emotional and psychological perception factor on home garden participation decision

Variable	Coeff	Std. Err	[95% Conf	Odds Ratio	Std. Err.	[95% Conf.	P>|z|
Pleasure	3.2682	1.1215	1.0700	26.2627	29.4539	2.9155	0.004
Inputs provision	-2.2614	1.0975	-4.4126	.1042	.1144	.0121	0.039
Learning agriculture	-.0136	.3594	-.7179	.9865	.3545	.4877	0.970
Awareness campaign	.4703	.2507	-.0210	1.6004	.4011	.9792	0.061
_Cons	-1.8686	.4165	-2.6849	.1543	.0643	.0682	0.000

Source: Computed from field survey data, 2022

, **, and * indicate significance at 0.6, 0.05, and 0.001 percent probability level respectively.*

Number of obs = 360, LR chi2(4) = 24.19, Prob> chi2 = 0.0001, Pseudo R2 = 0.0559

The odds of participating in home garden is higher by a factor of 26.3 among household heads who believe that pleasure could be derived from involvement in home garden than those who do not believe that pleasure could be derived from getting involved in home garden. This result shows that a unit increase in an anticipated pleasure derived from home garden (that is, going from zero to one) leads to a 26.3 increase in the log odds of participating in the home garden, provided that all other variables in the model remains constant. Simply put using the coefficient result; the odds of participating in the home garden increased by 3.4 % among household heads who anticipate derivation of pleasure from home garden involvement than those who do not. The result could be attributed to the fact that the household head will decide to participate in the home gardening if he/she believes that pleasure could be derived from getting involved in it.

The household heads who expect the government to provide inputs such as seeds, seedlings, and fertilizer are less likely to participate in home gardens. The provision of inputs to the household head by the government for home gardens has a significant likelihood of influencing home garden participation decisions. However, the expectation that the government should provide inputs negatively impacts the household's decision to participate in the home garden by a factor of 0 .10. The reality is that the government is not and might be less likely to map out an inputs provision programme for the home garden. This is because the government might find it difficult to provide input for every household to use for home gardens. This result shows that households whose decision is to participate in the home garden should not wait for the provision of inputs by the government.

The home garden awareness campaign can influence the household head's decision to have a home garden. It has a positive relationship with the household head's decision to participate in the home garden. The household head who received a home garden awareness campaign is 16 percent more likely to own a home garden. Ironically, smallholder and commercial farmers' noise on food security promotion has prevented them from recognizing the need for an intensive home garden awareness campaign and the holistic role of the home garden. This result is similar to reports of Galluzzi et al. (2010), which stated that despite the poor home garden awareness campaign, it plays a significant role in promoting the benefit of home gardens.

4.4. Comparison between socioeconomic characteristics and emotional/psychological perception influence on home garden participation decision

This research has discovered that socioeconomic characteristics and emotional/psychological perception influenced home garden participation decisions. However, it will be more interesting to know which of these factors significantly influence the model of the household head's decision to participate in the home garden. Our analysis used the pseudo-R-squared to describe the model that best explained the variability of socioeconomic characteristics and the dependent variable's emotional/psychological perception factor. Thought R square or Pseudo R square might not be of great concern in logistic regression fitness of the model, it could be used for comparison classify two groups based on point-biserial correlation (Tjur, 2009). It should be noted that the pseudo-R-squared value is more statistically sound compared to another pseudo R-squared outcome of the same type. The pseudo-R-squared value of the socioeconomic characteristics model is 0.1283, and the pseudo-R-squared value of the emotional/psychological perception model is 0.0559. The pseudo-R-square value of the logistic model that explained the variation in the dependent variable of the socioeconomic characteristics is higher than that of the emotional/psychological perception of the household head's decision to participate in the home garden. Hence, socioeconomic characteristics better influenced the household head's decision to participate in the home garden than emotional/psychological perception. Though, factors such as pleasure and home garden awareness campaign influenced the household head's decision to own a home garden, marital status, age of the household head, and higher educational attainment better kick-start the household head's decision to have a home garden.

4.5. Scale of preference for home garden involvement

The households have a range of reasons behind their involvement in home gardens. Our research discovered that different households have a distinct preference that drives their involvement in home gardens. The

respondents were asked to identify and list the reasons they were involved in home gardens in order of importance using 5 points Likert scale. The value of the Likert scale ranges from 1 to 5, with 1 representing very little importance, 2 equals to little important, 3 equals to moderately important, 4 equals to important, and 5 equals to extremely important. The value of the mean score of fresh food reason behind most of the household head's involvement in home garden falls on the range of extremely important. Hence, the household head's determination to access fresh and healthy agricultural food forms the fundamental reason for most engagement in home gardens. This result could be because some household heads understand the significance of sweet taste and nutritional richness associated with fresh food.

One factor that keeps and ensures the continuity of an individual or organisation in a particular activity is the pleasure derived. Pleasure is the second most important reason most household heads are involved in a home garden. The pleasure household head gets from their home garden could be one of the reasons most of them said they were attached to their home garden. This attachment is evidenced in some home gardeners visiting their garden not less than six times a week, while some visit their home garden at times twice a day to take a look.

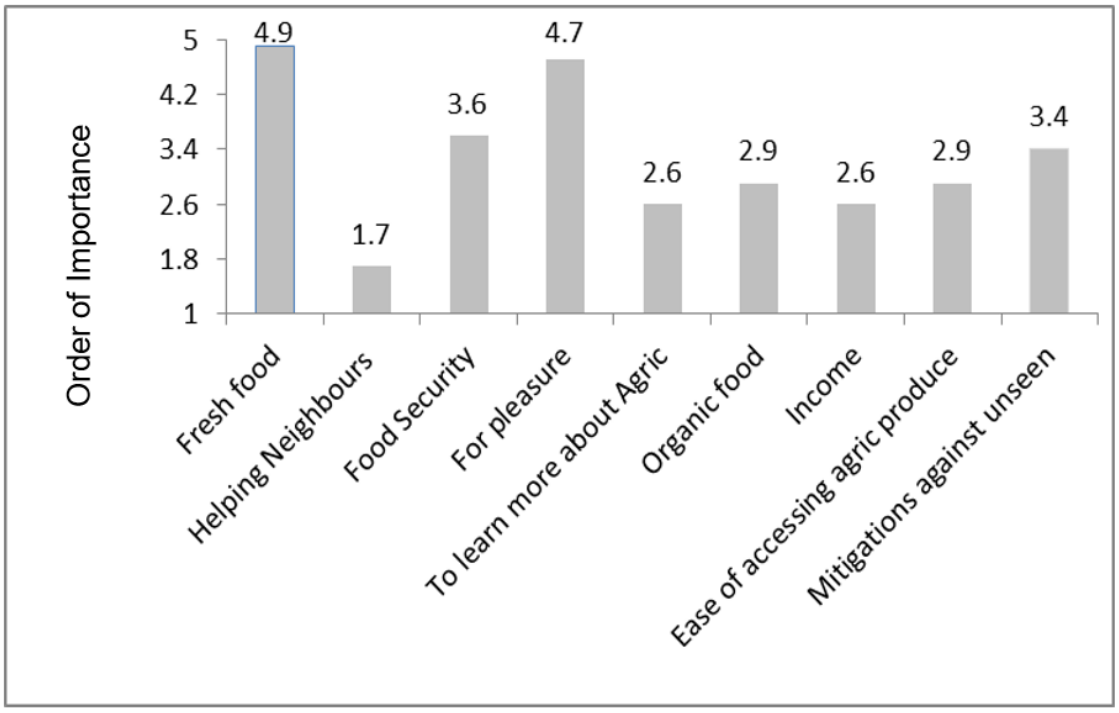

Figure 1. Order of why households owned home garden

Food security is not the first two reasons households participate in home gardens. However, food security ranked third among the most important reasons behind the home gardener's scale of preference for home garden involvement. This result is similar to the findings of Lal (2020), which states that the home garden is significant to the household head because of its role in stimulating food security. Again, the result of the motive behind the household involvement in home gardens shows that despite the role of home gardens in improving household food security, there are other major driving forces behind household participation in home gardens.

In another development, the household head is involved in home garden because it is used as mitigation against unforeseen crises and outbreak challenges such as the Covid-19 pandemic. The need to meet scarcity and off-season crisis of agricultural produce is other reasons. It is a moderately important reason for household's involvement in home garden.

The need for organic food is also one of the crucial reasons the household head is involved in home garden. This could probably be because home garden could be one of the cheapest channels through which households could access organic products, since several households might not be able to sustain the continuous purchase of sufficient organic produce for the home. Home garden boosts the household's confidence in the organic food they consume because they are fully aware of the process that produces the food item.

The ease of accessing agricultural produce is a more important reason the household is involved in home garden than income. On the ease of accessing agricultural produce, the home garden allows the household head to easily access some varieties of agricultural products that are not commonly seen in the local market. For example, some foreign household heads easily use home gardens to access food produce, especially vegetables that are not usually consumed or sold in the local market. Income and helping of neighours with agricultural produce are among the minor reasons for household involvement in home garden.

Home garden provides the opportunity for some household heads to give helping hands to their neighbours by providing food items. However, this is the least reason for the household head's involvement in home garden. On some occasions, some of the home gardeners reported giving excess produced food items to their neighbours, especially during the harvest period. Some home gardeners have also reported the habit of using the home garden to assist a neighbour in Californian, United States (Algert et al., 2016). They noted that this habit of assisting their neighbour with produces from their home garden improves their cordial relationship with their neighbour.

Home garden allows the opportunity for some households to learn agricultural activities. The opportunity to learn agricultural activities provided by home gardens is listed among the reasons behind the household heads' involvement in it. The result of the learning platform provided by the home garden is similar to the findings of Moreno-Black et al. (1996), which states that home gardens not only provide the opportunity to learn the management and maintenance of existing cultivated crop, it also aids in the acquisition new crop domestication knowledge.

4.6. Home garden food items and household food security

Despite food security not being the extremely important reason for household head involvement in home gardens, home garden plays a vital role in promoting food security and diversity. Home garden not only provides fresh, healthy food items, which is one of the cardinal pillars of food security, but it also serves as a means of achieving households' food diversity through the provision of varieties of food items for the home as presented in Table 6. This result corroborates the findings of Rammohan et al. (2019) that home gardeners cultivate various crops and vegetables for consumption. Occasionally, the home garden provides abundant food items for the household, especially during harvest. The discussion on home gardens and food security here is restricted to food items mainly produced by gardeners sampled in the study area, which are listed in Table 6.

4.7. Commonly cultivated home garden crops

Different home gardeners cultivate different crops in their garden, but in some cases, there are some common crops cultivated by gardeners in an area. Some of the commonly cultivated crops by home gardeners sampled in the study areas include maize, cabbage, spinach, tomatoes, butternut, lettuce, onion, potatoes, watermelon, celery, carrot, pineapple, beetroot, beans, peas, grape, squash, okra, sweet pepper, cucumber, and broccoli. In the study area, the commonly cultivated crops by all the gardeners are cabbage and spinach.

Table 6. Common food items produced and purchased by home gardeners

Food item	Measurement	Percentage of gardeners who planted	Percentage of gardeners who purchased	Fraction from home garden in a year	Fraction from market in a year
Maize	Number by head	62	65	23.8	18.5
Cabbage	Number by head	100	23	7.3	10.9
Tomatoes	Kg	60	45	45.3	30.5
Butternut	Number by head	45	60	13	11
Lettuce	Number by head	35	36	6.8	4.8
Onion	Kg	58	100	7.6	28.1
Potatoes	Kg	44	100	19.6	27.4
Watermelon	Number by head	38	18	3	2.5
Spinach	Bundle	100	30	28.7	14.4
Celery	Bundle	34	14	8.2	5.8
Carrot	Kg	29	100	16.2	27.4
Pineapple	Number by head	26	8	3.6	2.4
Beetroot	Kg	34	96	6.5	6.2
Beans	Kg	18	91	6.9	11.9
Peas	Kg	28	3	3.5	2.6
Grape	Bunch	5	0	21	0
Squash	Kg	35	26	5.2	3.2
Okra	Kg	4	0	8	0
Broccoli	Kg	21	23	3.9	3.1
Sweet pepper	Number by head	53	100	9.2	28.1
Cucumber	Number by head	29	23	5.6	3.8

Source: Computed from field survey data, 2022

Our research shows that in all the types of the creeping crops cultivated, the proportion of home gardeners who cultivated creeping crops is less than average. This result could be attributed to lack of spacious land, or limited knowledge of how to manage creeping crops by the home gardeners.

Home gardens provide a household with an indigenous food item that most people do not commonly sell, produce, or consume in an area. According to some of the home gardeners who are not originally from the study area cultivated their indigenous food crops from their origin. More so, home garden enables some households not to purchase some food items from the market, thereby saving money. Our research shows that none of the home gardeners in the study area purchased rape and okra from the market. Not purchasing some of these food items from the market could be that they are not readily available in the study area market. In another development, the role of home garden is to contribute to the household's food security while reducing household expenditure on food items. For instance, despite having a home garden, all the gardeners purchased potatoes, carrots, and onions. However, home garden has reduced the quantities they would have ordinarily bought from the market. This could be because some produced from home gardens are not large enough to sustain the household through the year.

During the home garden harvest season, the produce from home garden often far exceeds the quantities usually purchased from the market for home consumption. For example, the average quantity of maize produced for the household from home garden in a year by some households was more than the quantity purchased. Almost half of the home gardeners cultivated tomatoes. This shows that most home gardeners are likely to cultivate tomatoes on average. In addition, the result also shows that, on average, the quantity of tomatoes gotten from home garden in a year by household head gardeners who cultivated it is far higher than the quantity purchased by home gardeners who did not cultivate tomatoes. This means that, had all the home gardeners cultivated tomatoes, there could be a high probability that they all would not have purchased fresh tomatoes from the market.

4.8. Household head responses to government policy and programme on home garden

This sub-section addresses the household heads' opinion on home garden policy and grogrammes by the government of South Africa. Almost all the respondents complained government's poor disposition to home gardens in South Africa. However, they honestly desire active government support for the home garden but also bitterly regret the inability of the government to champion effective home garden initiatives and policy. This result is similar to the condition in Nepal, where home garden policy does not exist. Still, it is also not a priority programme of the government despite its top benefit (Gautam et al., 2006).

The lack of government support for home gardens is evidence that 67 percent of the respondents have not received home garden awareness campaigns either through radio, television, extension officer, or any other means in the study area in South Africa. This result is contrary to what is being practiced in a place like China, where most households adopted and harnessed the benefit of home gardens through recent government policy formation and implementation, which supports the establishment of urban gardens, including community gardens, rooftop gardens, and school gardens (Hou, 2020). In South Africa, the majority (79 percent) of the household heads does not only advocate for home gardens but would be actively involved in home gardening if they receive training.

5. Conclusion

There is huge unquantifiable benefit in home gardening. Unfortunately, many households have not recognized nor tap into this unexploited home garden potential. Many households in some areas do not participate in home garden due to the fact that they lack adequate knowledge of the benefits of home garden. Home gardens improve household dietary diversity through the provision of various food items. Home garden plays a crucial role in improving household food security. In fact, home garden enables households to access fresh and nutritious foods, engage in extracurricular activities, stimulates knowledge of growing plants, provides a platform to interact with nature, and generates additional income for some households, while acting as a place of sober reflection. The household heads' socioeconomic characteristics that influence home garden participation decision are age, marital status, educational type, household size, while anticipated pleasure to be derived for involving in home garden, expectation of inputs provision by the government and awareness campaign are the emotional/psychological perception that influenced home garden participation decision. Household heads' socioeconomic characteristics better influenced home garden participation decision than emotional/psychological perception. However, emotional/psychological perception might better sustain household head's involvement in home garden. In fact, pleasure which is one of the emotional benefits derived from home garden top the chart of the scale for reasons household head engaged in home gardens. Most households, particularly in South Africa, have not benefited from home garden policy, which could be one reason they are not involved in home gardens. However, the majority of the households are effective and implementable policies that could drive home gardening involvement.

5.1. Recommendations

Owing to the tremendous home garden benefits, holistic policies and action plans that will enable the larger proportions of household heads to get involved in home gardens should be formulated and adopted by all stakeholders concerned. Basis of the findings of this study, there should be a policy that provides little quantities of agricultural inputs as motivation to households for home gardens purposes at various designated place such as ministry of agriculture. Home garden awareness campaign should be revamped and intensified. While this awareness campaign and training on home gardening practices should target all households, greater attention should be given to the adult household head, married household head, educated household head, and large household size for the growth of home garden. Individual households are advised to get into home gardening without waiting for government assistance as they will derive tremendous pressure, satisfaction, and other benefits beyond additional benefits of income and food security.

The research contributes to the awareness of home gardening and its relevance while providing information on how some households are harnessing huge benefits from home gardens. More household emotional feelings and perceptions will improve if governments' policy gets more household heads to participate in home gardening. Below are some highlights of this study that can be useful for policy and practice:

- There are far-reaching benefits of home gardening that drive the reasons for some household heads' involvement in it.

- Government and policymakers need to intensify awareness of home gardening, especially in developing countries, as the current knowledge and awareness campaign on hone gardening is ineffective and insufficient to ensure sustainable home gardening positively.
- There are limitations if policymakers do not consider household heads' socioeconomic characteristics and beyond when attempting to address the determinants of household heads' decision to participate in home gardening.

5.2. Limitation and suggestion for further study

The present study is limited to a particular region. Hence, other studies in other regions should be carried out to see if other scales of preference could top food security and income as the reason behind the households' involvement in home garden. Considering the integral role of the home garden to the household and owning to the fact that some households are not participating in the home garden, further study should be conducted on the home garden sustainability and the factor responsible for its sustainability.

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